

## RI State Energy Plan

Executive Summary.

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### 1. Baseline—Where we are.

**The Job Creation Imperative.** Located in the Boston-Washington megalopolis, Rhode Island is the smallest state in the United States and, after New Jersey, the second most densely populated. Rhode Island's population of slightly more than a million people is concentrated along Narragansett Bay and the Blackstone River. Compared to other States, Rhode Island reached its economic zenith in the first quarter of the twentieth century, when it had a strong manufacturing economy dominated by the textile industry. Although declining, manufacturing remained the economic engine of the state into the 1980s. While the State's economy diversified in the second half of the twentieth century, its population increased modestly, and its personal income rose, this growth was not as robust as in many other states. With the exception of the 2001-2002 recession, Rhode Island typically fell into recession sooner than other states in the region and recovered from recession later. Job creation has been a critical on-going concern in Rhode Island.

**Imported Fuel Dependency.** In the twentieth century fossil fuel economy, Rhode Island was at the end of the pipe-line. Virtually all of its energy supply came from imported fuels, either from other areas of the United States or from foreign nations. Rhode Island lacks the water potential for large-scale hydro-power, and in the 1970s, two proposals for nuclear power plants were withdrawn due to environmental concerns. Rhode Island is part of the regional electrical grid managed by ISO-New England; National Grid provides electrical transmission and distribution services to about ninety-nine percent (99%) of the state and natural gas distribution. Rhode Island is connected by Algonquin Gas Transmission Company to the New England-New York regional gas transmission system. Petroleum, heating oils and transportation fuels, and liquid natural gas are supplied to Rhode Island through the Port of Providence, which is a sub-regional center for the distribution of these fuels.

Electrical generation capacity in the state is natural gas fired. Other fuel sources are *de minimis*. The gas fired electrical generating facilities in Rhode Island are: Ocean State

Power, Burrillville two units at 560MW; Manchester Street, Providence 495 MW, Tiverton 265 MW, and Johnston 545 MW. National Grid, however, procures the electricity it supplies to Rhode Island from multiple sources; for the period July 1, 2007, to June 30, 2008, the mix was as follows: natural gas (31.4%), nuclear (27.5%), imported electricity (12.4%), coal (11.2%), hydro power (4.7%), oil (3.8%); a diversity of other sources provided the remaining nine percent (9%).

**The Need for Energy Cost Savings.** Energy prices in Rhode Island are among the highest in the country. Measured in nominal dollar price per million British thermal units (Btu), Rhode Islanders paid \$ 22.22 for a million Btus, the fourth highest in the nation. Only Hawaii, at \$ 24.65 per million Btu, Massachusetts, at \$ 23.22 per million Btu, and Connecticut, at \$ 22.72 per million Btu, were higher. The price paid by Rhode Islanders is twenty-eight percent (28%) above the price (\$17.35 per million Btu) paid by the nation as a whole. While energy prices are slightly higher in Massachusetts and Connecticut than they are in Rhode Island, incomes are much higher. Per capita income in Massachusetts was \$ 46, 305 in 2006, in Connecticut it was \$51,600, while in Rhode Island, while per capita income in Rhode Island was \$ 37,669 --twenty-tree percent (23%) below Massachusetts and thirty-seven percent (37%) below Connecticut. In a nut shell, Rhode Islanders overall have less money to spend on high energy costs than their neighbors.

Since energy is imported from other places into Rhode Island, the money Rhode Islanders spend on energy flows out of the state's economy. Rhode Island is currently an energy consumer, not an energy producer.

**Consumption Pattern Challenges.** On the positive side, Rhode Island has lowest energy consumption per capita in the United States. At 203.7 million Btu per capita, Rhode Island is sixty-three percent (63%) below the level of the nation as whole (333.1 million Btu per capita).

Low levels of energy consumption, however, are not the same as high levels of energy efficiency. One person may own a large, powerful older car and drive it little, while another person may own a hybrid a drive much more, measured in miles per gallon the second person's car is much more efficient. Two factors stand out in contributing to Rhode Island low level of energy consumption. First the climate here is relatively moderate, mitigating the need for air conditioning, and second, the level of industrial use of energy is very low--Rhode Island is not a place of heavy industry.

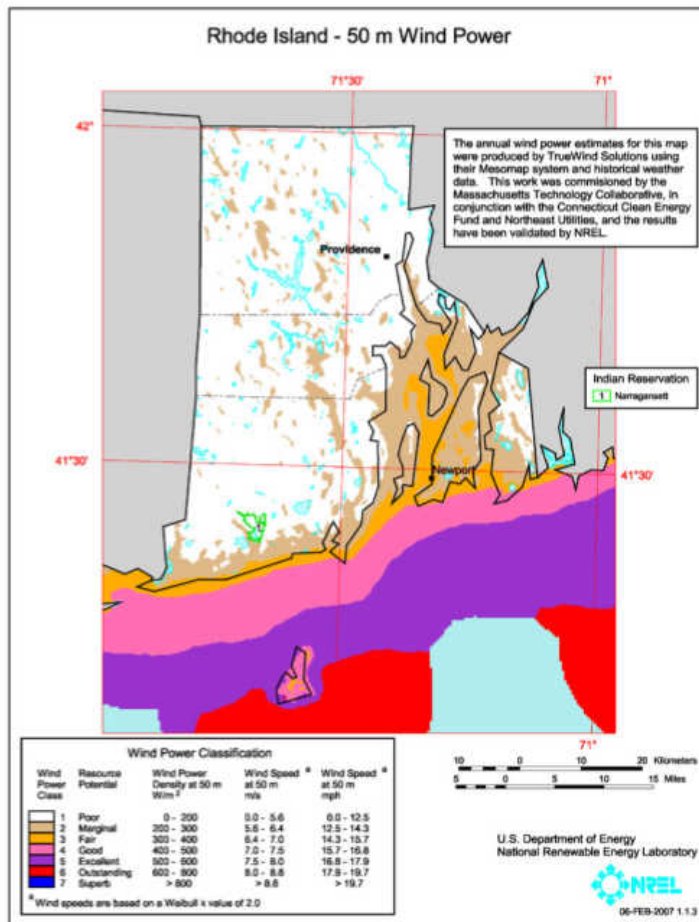
According to the Federal Energy Information Administration (April 2009) the industrial sector consumes just twelve percent (12%) of the energy used in Rhode Island; nationally the industrial sector share is thirty-three percent (33%). Residential use constitutes

thirty-three percent of energy consumption in Rhode Island. Commercial consumption is twenty-five percent of the total, and transportation accounts for thirty percent (30%) of consumption.

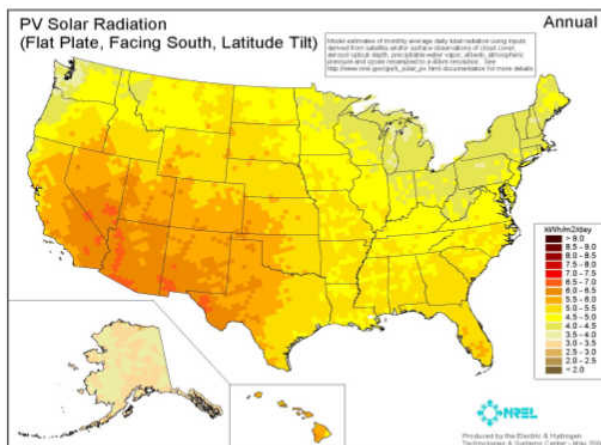
Since Rhode Island's population growth has been comparatively slow for the last half century, it stands to reason that the state has an older housing stock. According to the 2000 US Census, nearly the thirty percent of the housing units in Rhode Island pre-date 1940; twenty-four percent were built in the two decade period 1940-1959; and another twenty-six percent were built in the two decade period 1960-1979. The total housing stock in Rhode Island is approximately 440,000 units. Fifty-five percent of the dwelling units are detached single family homes. While the level of new construction fluctuates, residential building permits are issued in the state typically are in the range of 1,400 to 2,000 annually. While only nine percent (9%) of households nationally rely on home heating oil, in Rhode Island forty-two percent (42%) do. Conversely, thirty percent (30%) of households nationally use electric heat, while only eight percent (8%) of Rhode Island households do. Natural gas is used for heating in forty-six percent (46%) of Rhode Island households, compared to fifty-one percent (51%) nationally.

Transportation is second largest source of energy consumption. Although densely developed, Rhode Island is close to the national averages in average travel time to work: Rhode Island 23.5 minutes, national average 25.5 minutes, and in percentage of work trips in single occupancy vehicles: Rhode Island eighty percent, national average seventy-five percent; Rhode Island is below the national average in both car pooling, 10.4%/12.% and public transportation, 2.5 %/4.7%. The daily vehicle miles traveled in Rhode Island is about 24.3 million miles.

**Indigenous Energy Resources.** Rhode Island is not favored by abundant energy resources. Winds on-shore are neither strong nor steady; some coastal locations have wind regimes that may make community or smaller scale wind projects feasible. The major wind resource is off-shore; it appears sufficient to power a substantial, utility-scale project. Off-shore average wind speeds at a height of eighty meters have been interpolated to be up to be an AWS of 9.6 meters per second further off-shore, and fall to an AWS of 7.2 meters per second near-shore.



Rhode Island is in a more northerly latitude, is low in elevation, and is frequently overcast or cloudy; these circumstances militate against solar power, in the form of photo-voltaics, as means of meeting electric demand at a utility scale in a manner that is cost-effective. Solar thermal energy, for example to heat hot water, is justifiable for residential and commercial applications, dependent on site conditions.



Although, the western part of the state is sparsely by northeast megalopolis standards, there are neither large tracks of land for timber management nor industries that use wood for paper production or lumber and generate wood waste as a by-product. A report by the Department of Environmental Management found that while more than the fifty percent of the state remains forested and the biomass in woodlands is increasing, the average parcel size declined from 26 acres in 1973 to 13 acres in 1993. Wood is mostly used for home heating.

Historically Rhode Island's textile industry relied on on water power to run the the mills. Throughout the state, rivers were dammed , and many of the dams remain. A 1995 study by the Idaho National Laboratory found that Rhode Island has 11.5 MW of energy potential at existing dam sites.

Regarding geo-thermal potential in Rhode Island, ground source heat pumps can have a favorable pay-back in commercial and residential applications, especially if they are used to meet both heating and air conditioning loads. Since the efficacy of the heat pump increases with the difference between the ambient the temperature and the ground temperature, which is constant at roughly 55 degrees, geo-thermal energy is especially valuable during peak electrical use on hot summer days and peak gas use on cold winter days.

In Rhode Island waters, neither currents nor wave regimes are substantial enough to be cost-effective sources of energy at this time.

While solid waste has energy value, the state rejected proposals for waste-to-energy incineration facilities in the 1980s, and the statutory bias against such facilities remains in effect. There is a methane recovery facility at the state's Central Landfill. For example waste cooking oil can be converted into bio-diesel and used as a transportation or heating fuel; food and other putrescible wastes can be combined yard wastes and digested to produce compost and gas that can be used as a fuel, and waste wood can be pelletized.

**Evolving Public Response.** Public responsibilities for energy planning, management and oversight in Rhode Island are distributed among an array agencies and programs, with distinct powers, duties, and functions, which can be coordinated and net-worked. This structure has evolved over time. From the second decade of the twentieth century until the mid-1970s, initiative rested with private companies, including investor owned utilities, with utility regulation vested in the Public Utilities Commission, which was established in 1912 to assure the fairness and adequacy and rates.

In 1975, state government's role became more proactive. The energy crises and the OPEC

production reductions had made energy a pressing public policy concern. The State Energy Office was created by executive order 75-025 by Governor Noel. The Office actively promoted energy efficiency and renewable energy development, as well as providing assistance to lower income households hurt by rising energy costs. The shift in Federal policy in the 1980s coupled with declining real prices of fossil fuels made energy issues less of a public priority. The State Energy Office, in its various iterations, became more and more an entity managing Federal funds for weatherization and the Low Income Household Energy Assistance Program (LIHEAP).

The Public Utilities Commission pursued integrated resource planning with electric utilities, predominantly Narragansett Electric Company, which instituted a "demand side management program," in the early 1990s, which uses a surcharge of 2.3 mills per kilowatt hour to investment in energy efficiency measures and renewable energy development.

The halcyon days of free market capitalism of the mid-1990s brought utility restructuring to Rhode Island. In 1996, Rhode Island was the first state to dismantle vertically integrated utilities by separating electrical generation from electricity transmission and distribution. The promise was that the competitive market would work to dramatically reduce energy costs. While the Utility Restructuring Act of 1996 vitiated the ability of the distribution (Narragansett Electric Company, later National Grid) to undertake integrated resource planning, demand side management programs were made statutory.

During the multi-year phase-in of utility restructuring conditions changed, first energy prices did not drop as predicted and second a competitive market place for electrical supply did not emerge, except for large commercial and industrial customers. In 2000-2001, California went through a serious energy crisis caused by incongruent regimes for wholesale and retail prices and by market manipulation by private companies, notably Enron. In 2001, Enron, the lead proponent of utility restructuring and market approaches, imploded and went bankrupt. Hurricane Katrina hit New Orleans in September 2005 causing physical devastation and havoc in energy markets. Rising global energy demand drove a rapid escalation of energy prices through the middle of 2008, when the price of gasoline peaked at more than \$4.00 per gallon.

The turbulent first decade of the twenty-first century created a resolve to proactively address energy issues as a matter of public policy. First, electrical customers that had gone into the competitive market following the enactment of Utility Restructuring and that could no-longer find competitive market supplies were allowed to return to standard offer service. Second demand side management programs were extended. Third in 2004 a Renewable Energy Standard was enacted that established the goal of having fifteen percent (15%) of Rhode Island's electricity come from renewable energy resources by 2020.

Fourth consumer appliance efficiency standards were enacted in 2005.

In early 2006, Governor Carcieri, noting that rising energy costs threaten Rhode island's economy and competitiveness and had a great impact on household budgets, especially those of persons on fixed income, announced his five point energy agenda: 1) increase the availability of LNG in the State, 2) reform electric markets, 3) address the needs of low income households, 4) secure renewable energy resources, and 5) conduct energy audits of state buildings.

That June the General Assembly enacted "The Comprehensive Energy Conservation, Efficiency and Affordability Act of 2006". The general purposes of the act are: "(1) to provide Rhode Island residents, institutions and businesses the benefit of stability through diversification of energy resources, energy conservation, efficiency, demand management and prudent procurement, (2) to facilitate the development of renewable energy resources; (3) to make the cost of energy more affordable by mitigating demand and rates charged to low-income households; and (4) to strengthen energy planning, program administration, management, and oversight in a manner that is publicly accountable and responsive." The Act established the Office of Energy Resources and created the Energy Efficiency and Resources Management Council, extended demand side management programs and standard offer service, created a rate-supported program to make efficiency investments in natural gas use, and made "least cost procurement" a basic principal for acquisition of electrical supply by distribution companies. Least cost procurement provides in meeting projected electrical demand, investments will be made in energy efficiency first when those are lower cost than traditional supply, after provision has been made for doable, lower cost efficiency investments, standard supply procurement follows. The comprehensive act also included provisions for state support of low income energy assistance through a redirection of gross receipts taxes on electrical and gas utilities and the sales tax on commercially-used heating oil; these were repealed when the economy slowed and state revenues declined.

In 2007, State participation in the Regional Greenhouse Gas Initiative, a cap and trade program for carbon emissions from electrical generating facilities was authorized statutorially. A Regional Greenhouse Gas Stakeholders Process operating under the aegis of the Department of Environmental Management had been an important proponent of energy efficiency and pollution reduction measures and supplied important analyses of the cost and effectiveness of various means of reducing greenhouse gases. The Stakeholders Process, in its July 2002 *Action Plan*, offered fifty-two strategies to meet the goals set the New England Governors and the Eastern Canadian Premiers of reducing greenhouse gas emissions to 1990 levels by 2010, to 10% below 1990 levels by 2020, with a long term goal of reducing emissions by 75% to 85% percent below current levels. A

number of the key strategies have been implemented, including both the Renewable Energy Standard and the Rhode Island participation in the Regional Greenhouse Gas Initiative.

To facilitate community scale renewable energy development net metering was authorized by in 2007 and expanded in 2008. Also in 2008, in order to provide for their integrated administration, renewable energy funds were shifted to the RI Economic Development Corporation.

**State Agency Powers and Functions.** Energy related responsibilities are assigned to an array of of state agencies, this is reasonable because energy issues are complex and multi-dimensional. Rhode Island's scale facilitates interagency cooperation, thus net-working responsibilities and functions can be effective in accomplishing broad purposes and undertaking complex initiatives. State agencies with significant energy related responsibilities are as follows.

The Public Utilities Commission (chapter 39-1 of the General Laws) is a quasi judicial body with the power to the to supervise, regulate, and make orders governing the conduct of companies offering to the public in intrastate commerce energy, communication, and transportation services and water supplies, including approval of rates. Allied with the Commission is the Division of Public Utilities, which implements and oversees public utilities regulation in accordance with the requirements of law and the orders of the Commission.

The Department of Administration (chapter 42-11 of the General Laws) is both the staff agency of state government and the umbrella entity for a number of offices, programs, and commissions some of significant responsibility for energy issues. These include the Office of Energy Resources, the Energy Efficiency and Resources Management Council, the Statewide Planning Program, the Housing Resources Commission and the Building Code Standards Committee.

The Rhode Island Office of Energy Resources, the OER, (chapter 42-140 of the General Laws) provides comprehensive, integrated development, administration and oversight of energy policies, plans and programs to meet state and federal requirements and to provide policy guidance to executive leadership. The Office, headed by the Commissioner, Office of Energy Resources, is assigned to the Department of Administration. The Office administers programs including federal State Energy Office programs; development and management of energy efficiency and resource management programs, including wind energy; energy outreach and education, and low income energy assistance.



The current activities of the OER, which is primarily supported by Federal funds, include:

- Advising the Governor on energy matters,
- Serving as the State Energy Office,
- Providing a central point of contact for energy matters,
- Administering the United States Department of Energy Efficiency and Renewable Energy's State Energy Program to implement the state's energy priorities,
- Promoting diverse energy resources including energy efficiency, system reliability resources and wind power,
- Providing comprehensive energy information and education,
- Serving on and staffing the Energy Efficiency and Resource Management Council (Council) and subcommittees,
- Promoting Least Cost Procurement of utility electricity resources,
- Providing low income heating and weatherization assistance,
- Developing and implementing the RI annual plan for allocating the proceeds of the Regional Greenhouse Gas Initiative,
- Taking part in Public Utility Commission proceedings,
- Coordinating development of 400 megawatts of offshore wind power,
- Securing and administering federal LIHEAP funds and utility ratepayer system benefit funds to provide heating assistance and weatherization services to low-income families,
- Securing and administering ARRA DOE Energy programs and projects including ARRA SEP, EECBG, Weatherization and Appliance Efficiency Rebates, and
- Working under the RI Office of Recovery and Reinvestment together with Rhode Island Science & Technology Advisory Council (STAC), coordinate ARRA formula and competitive grant offerings.

Energy Efficiency & Resources Management Council (chapter 42-140.1 of the General Laws) is an advisory body with the power to evaluate and make recommendations "with regard to the optimization of energy efficiency, energy conservation, energy resource development;... "the development of a plan for least-cost procurement" and to provide stakeholder "involvement in energy efficiency, energy conservation, and energy resource management;" and to "promote public understanding of energy issues and of ways in which energy efficiency, energy conservation, and energy resource diversification and management can be effectuated."

The Statewide Planning Program (section 42-11-10 of the General Laws) prepares, adopts, and amends plans "for the physical, economic, and social development of the state." The state guide plan is comprised of elements dealing with "land use; physical development and environmental concerns; economic development; housing production; energy supply, including the development of renewable energy resources in Rhode Island, and energy access, use, and conservation; human services." It serves as "a means for

centralizing, integrating, and monitoring long-range goals, policies, plans, and implementation activities." The State Planning Council is the "metropolitan planning organization" for transportation planning in Rhode Island.

The Building Code Standards Committee (section 23-27.3-100.1.3 of the General Laws) The state building code standards committee is required to adopt, promulgate, and administer a state building code for the purpose of regulating the design, construction, and use of buildings Under section 23-27.3-100.1.5.4, the state building code standards committee has the authority to "adopt, maintain, amend, and repeal an optional energy conservation code,...based on appropriate nationally and internationally recognized models, and to promulgate and administer the energy conservation code. The energy conservation code shall contain provisions pertaining to, but not limited to, the construction of buildings, the use of renewable energy resources in buildings, the efficient use of energy within buildings, and the orientation of buildings on their sites." The state building commissioner serves as the executive secretary to the state building code standards committee and has the authority to enforce "the provisions of the state building code in a municipality where there is no local building official."

The Housing Resources Commission (chapter 42-128 of the General Laws) has among its purposes developing and promulgating "state policies, and plans for housing and housing production and performance measures for housing programs," coordinating "activities among state agencies and political subdivisions pertaining to housing," promoting "the stability of and quality of life in communities and neighborhoods," providing opportunities for safe, sanitary, decent, adequate and affordable housing," and encouraging "public-private partnerships that foster the production, rehabilitation, development, maintenance, and improvement of housing and housing conditions, especially for low and moderate income people."

The Department of Environmental Management (chapter 42-17.1), the state's environmental regulatory agency, has the power "to supervise and control the protection, development, planning, and utilization of the natural resources of the state, such resources, including but not limited to, water, plants, trees, soil, clay, sand, gravel, rocks and other minerals, air, mammals, birds, reptiles, amphibians, fish, shellfish, and other forms of aquatic, insect, and animal life." The Department's responsibilities with regard to energy include air quality protection--the Department has the lead role in Rhode Island's participation in RGGI--forestry, solid waste and waste to energy facilities, and minerals.

The Energy Facility Siting Board (chapter 42-98 of the General Laws), which has the

Public Utilities Commission, the State Planning Program, and the Department of Environmental Management members, consolidates the licensure and regulatory authority of the state into a single body, which renders the final licensing decision concerning the siting, construction, operation and/or alteration of major energy facilities. The Board must find that energy facilities are "justified by long term state and/or regional energy need forecasts;" that the energy produced is "at the least possible cost to the consumer consistent with the objective of ensuring that the construction, operation, and decommissioning of the facility shall produce the fewest possible adverse effects on the quality of the state's environment," and "before approving the construction, operation and/or alteration of major energy facilities, the board shall determine whether cost effective efficiency and conservation opportunities provide an appropriate alternative to the proposed facility." The energy facilities siting board is required to "give priority to energy generation projects based on the degree to which such projects meet, criteria including, but not limited to:

- (i) Using renewable fuels, natural gas, or coal processed by "clean coal technology" as their primary fuel;
- (ii) Maximizing efficiency;
- (iii) Using low levels of high quality water;
- (iv) Using existing energy-generation facilities and sites;
- (v) Producing low levels of potentially harmful air emissions;
- (vi) Producing low levels of wastewater discharge;
- (vii) Producing low levels of waste into the solid waste stream; and
- (viii) Having dual fuel capacity.

The RI Housing Housing and Mortgage Finance Corporation, "Rhode Island Housing" (chapter 42-55 of the General Laws) acts to "encourage the investment of private capital and stimulate and assist in the construction, rehabilitation, operation, retention, and maintenance of residential housing and health care facilities through the use of public financing, to provide construction and mortgage loans, to make grants to shelters for the homeless, and to make provision for the purchase of mortgage loans and otherwise." Rhode Island Housing has the power "to acquire and operate housing projects on an individual or partnership basis in order to meet the housing demands of the state."

The Rhode Island Public Transit Authority, RIPTA, (chapter 39-18 of the General Laws) is a quasi-public corporation, which has as its purposes (1) Providing "public transit services that meet mobility needs of the people of the state, including the elderly and disabled;" (2) Increasing "access to employment opportunities;" (3) Connecting "different modes of public transportation, including rail, air and water services;" (4) Promoting "community design that features public transit services as defining elements of a community;" (5) Facilitating "energy conservation and efficient energy use in the

transportation sector by providing public transit services;" and (6) Mitigating traffic congestion and enhancing air quality. The RIPTA runs the intrastate bus service in the state.

The Coastal Resources Management Council, the CRMC, (chapter 46-23 of the General Laws) has planning, regulatory and permitting powers for the marine waters of the state and the adjacent land. The CRMC is empowered to adopt special area management plans "to provide for the integration and coordination of the protection of natural resources, the promotion of reasonable coastal-dependent economic growth, and the improved protection of life and property." The CRMC has explicit jurisdiction over "power generating over forty (40) megawatts and desalination plants" in so far as they affect the marine waters of the state or the state's coastal zone.

The Rhode Island Economic Development Corporation (chapter 42-64 of the General Laws) is the full service, official economic development organization for the state of Rhode Island. A quasi-public agency, the Corporation serves as a government and community resource to help streamline the business expansion in, and relocation to, Rhode Island. The agency assists companies with commercial real estate, business financing, workforce training and other relevant issues. In 2008 the EDC was given responsibility for administering state support for renewable energy projects. Thus the EDC, in the furtherance of its responsibilities to promote and encourage economic development, administers a renewable energy development fund for the coordinated administration of the renewable energy standard (chapter 39-26) and the DSM renewable energy program (section 39-2-1.2). The EDC may upon the request of any person undertaking a renewable energy facility project, grant project status to the project, and a renewable energy facility project, which is given project status, is deemed to be an energy project of the corporation, and as such may use the Energy Facility Siting Board process.

The Department of Transportation (chapter 42-13 of the General Laws) is a comprehensive surface transportation agency, charged with planning, design and engineering, and maintenance of transportation facilities, including "roads, bridges, transit facilities, airport facilities, port and waterways facilities, and all other transportation facilities." Although this breadth of responsibility was conferred on the Department when it was created in 1970, the Department was strongly associated with highway construction. The passage of the Intermodal Surface Transportation Efficiency Act in 1991 (ISTEA) gave a Federal imprimatur to the broader conception of the Department's function, with the expectation that transportation would be considered holistically. Significantly for the SEP, the Department is also charged with installing and maintaining traffic control signs and signals.

## 2. Where are we headed? Trends

It is informative to consider how things might go if Rhode Island simply took a hands-off, business-as-usual approach to the energy issues confronting the state. Considering this possibility is only hypothetical and illustrative. The fact of the matter is that Rhode Island has decided to move aggressively in pursuing energy efficiency through "least cost procurement" and in developing renewable energy through a large off-shore wind project.

Two basic things stand out in the business-as-usual scenario: through 2007 Rhode Island was on a course of moderate to slow economic growth, business climate, and levels of educational attainment in the workforce remaining major structural barriers, and increasing energy consumption.

Over the prior forty years, state experienced warmer winters and hotter summers. With global warming this trend is predicted to continue through the balance of the twenty-first century. In twenty years, according to the Union of Concerned Scientists, Rhode Island may have temperatures more like the Middle Atlantic state of New Jersey than those traditionally experienced in New England. With this trend, the number of heating degree days will decline in the winter, while the number of cooling degree days will increase during the summer. The use of air conditioning is likely to become more widespread. Overall electrical consumption is expected to increase moderately, on average approximately 1.2 percent annually and peak load demand more rapidly, on average about 2.0 percent annually.

The state's population is, consistent with the national trends, growing older and within Rhode Island it is dispersing. Transportation 2030 projects that average daily vehicle miles traveled will increase from 26.1 million miles in 2010 to 28.7 million miles in 2020 and 31.3 million miles in 2030. Average length of trips will increase from 10.1 miles in 2010 to 10.37 miles in 2020 and to 10.69 miles in 2030. Traffic congestion is expected to increase, and average travel speeds are expected to decline.

While the Rhode Island Public Transit Authority ridership has been increasing over the last several years, and sharply in mid-2008 when gasoline prices spiked, fiscal constraints have impaired the system's ability to expand and to up-grade its service. RIPTA's funding problems are perennial.

The trends in both climatic conditions and transportation suggest that Rhode Island will continue to rely heavily on fossil fuels, predominantly natural gas for heating and electrical generation and petroleum transportation and heating.

Average annual energy prices for petroleum and natural are projected by the US Energy

Information Administration to be at their lowest level in 2009 and then commencing in to 2010 to increase by an average of 1.4 percent year year, in 2007 constant dollars, to 2030. The EIA Report 0383 shows, in 2007 dollars, heating oil prices rising from an average of \$2.54 per gallon in 2009 to 3.34 per gallon in 2020 and gasoline prices rising from \$2.28 per gallon in 2009 to \$3.60 in 2020.

The actual experience of energy prices has nothing like steady gradual trends, instead it has been a roller coaster ride, propelled by changes in global demand, geo-political disturbances, climate events and storms (e.g. hurricane Katrina), and speculation. Actions that were justifiable when prices were high seem economically imprudent when prices drop. Similarly the absence of investments in efficiency and alternatives when prices are low becomes a costly mistake when prices rise. The business-as-usual scenario continues Rhode Island's dependence of fossil fuels imported from elsewhere in the country and from foreign countries. Rhode Island remains at the end of the energy pipeline.

Rhode Island Department of Labor and Training in its Occupational Outlook suggests that the 2006 manufacturing employment of 52,726 will decrease 9.2% by 2016, to only 47,000 jobs. Between 2001 and 2007 there was a 21% decrease in the number of manufacturing companies (from 2569 to 2028). The same document argues that the 2006 service sector employment (NAICS 72) of 42,561 will likely increase by 14.9% by 2016 to 48,900 jobs.

The knowledge economy, as defined by NES, includes a combination of industries that are knowledge-driven, knowledge-dependent and knowledge-producing. Examples include biotechnology and medical devices, healthcare, electronic/industrial hardware, digital media, telecommunications, information technology software, scientific research, design and engineering, financial services and education. Most of the expanding occupations in RI are knowledge based such as: Registered Nurses, Teachers, Computer Systems Analysts, Management Analysts, etc.; however as the baby-boom generation retires, the average level of educational attainment in the work force will likely decline.

Rhode Island has experienced overall slow growth in jobs and wages. Rhode Island average annual wage has been lagging behind the US wage.

Year	RI Annual wage	US Annual wage
2001	\$33,603	\$36,219
2002	\$34,810	\$36,764

2003	\$36,415	\$37,765
2004	\$37,651	\$39,354
2005	\$38,751	\$40,677
2006	\$40,454	\$42,535
2007	\$41,646	\$44,458

The business-as-usual scenario constrains Rhode Island's ability to improve environmental quality and reduce greenhouse gas emissions. High levels of land consumption would continue. Woods and open space would be lost. Traffic congestion would increase.

### 3. Where do we want to be? Vision and goals.

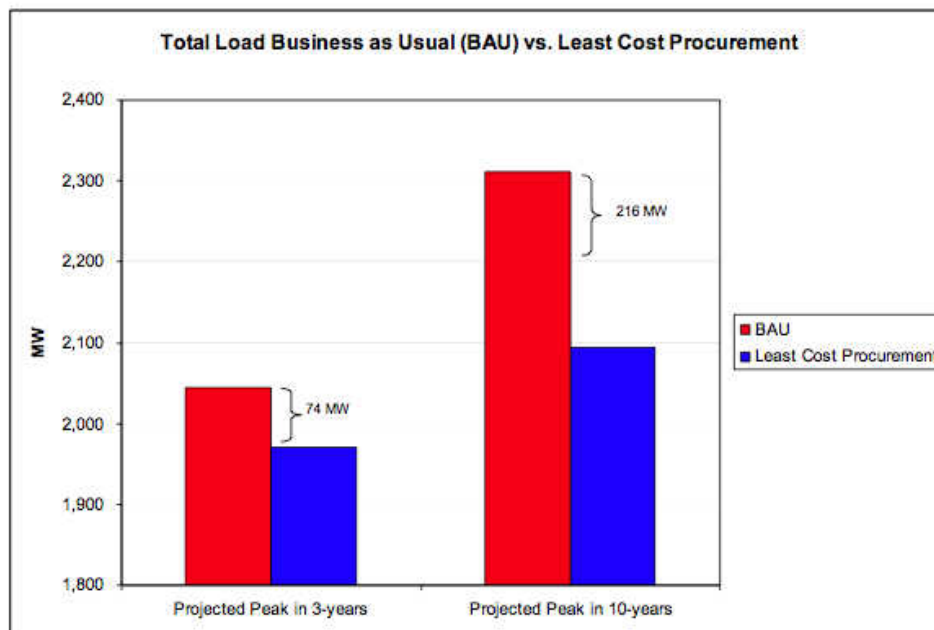
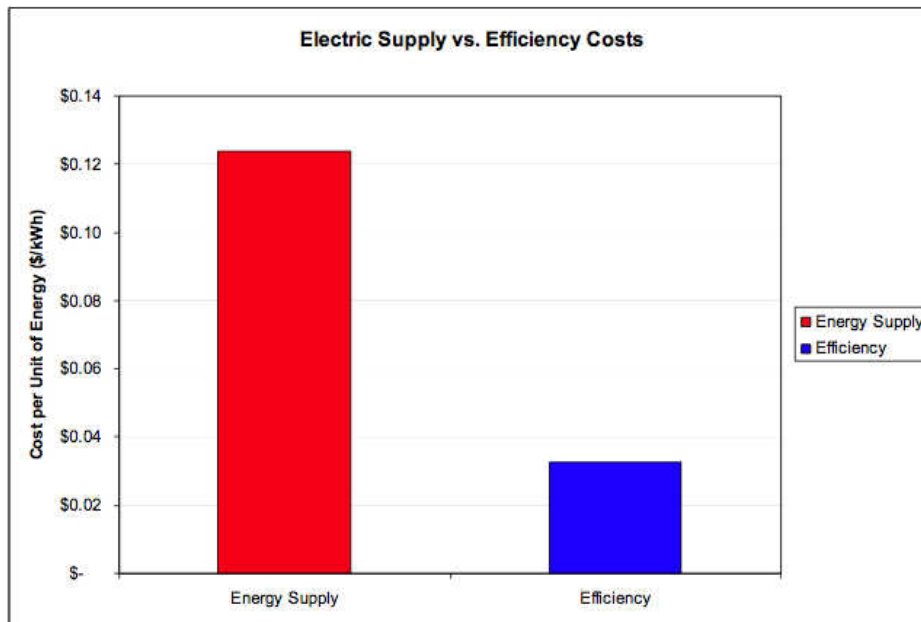
Rhode Island aspires to be a state with a strong, resilient 21st century economy. This will require more than a reinvigorated use of 20th century economic development principals and strategies. Net-worked organizational structures, flexible production, innovation, collaboration, and knowledge worker skills, attributes of the "new economy", are vital aspects of the economy Rhode Island seeks to develop. It will be an economy in which science, technology, innovation, and diffusion play a basic role. Addressing energy issues is integral to this transformation.

Job creation is the first requisite. As the RI EDC put it in its *2009 Economic Growth Plan*, "Our mission is to create jobs, help companies expand and develop their workforce, and identify opportunities to bring new companies into our state. Our immediate focus is to preserve and retain jobs in an economic climate of high unemployment and unprecedented uncertainty. Our strategy for Rhode Island's long-term economic vitality is to enrich Rhode Island's economy with knowledge-based and green industries that will provide better job opportunities, and be competitive in the global economy."

Rhode Island continues to have the lowest energy consumption per capita of any state and progresses toward having the lowest level of energy expenditures as percentage of gross domestic product in the nation. Achieving this second goal marries Rhode Island's commitments to substantially growing its economy and to achieving high levels of energy efficiency and energy conservation. (In 2006 Rhode Island's energy expenditures were 7.6% of GDP, the ninth lowest in the nation, New York's percentage stood at 5.8%, the lowest, Delaware's percentage was 6.0% and California's 6.7%.)

Rhode Island is a place where use of imported fuels has been reduced by twenty percent. This level energy of independence flows from development of utility scale renewable

energy development, comprehensive commitment to energy efficiency measures, widespread adoption of non-utility scale renewable applications, and improved transportation efficiency. Rhode Island achieves the ARRA-DOE goal of a 25 percent increase in efficiency over 1990 levels.

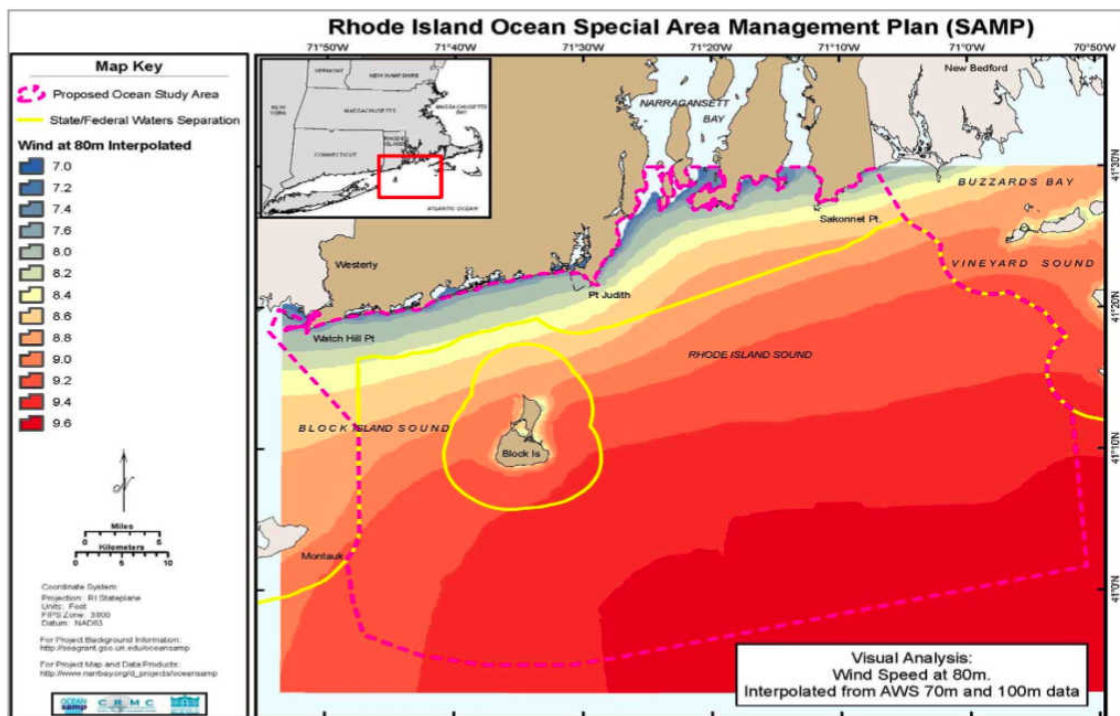


The above two figures were formally submitted by the Energy Efficiency and Resources Management Council to the Public Utilities Commission in July 2008 in the



"Opportunities Report." They show that energy efficiency produces savings in energy costs and that commitment to efficiency can reduce the growth in peak demand. Peak demand contributes price volatility.

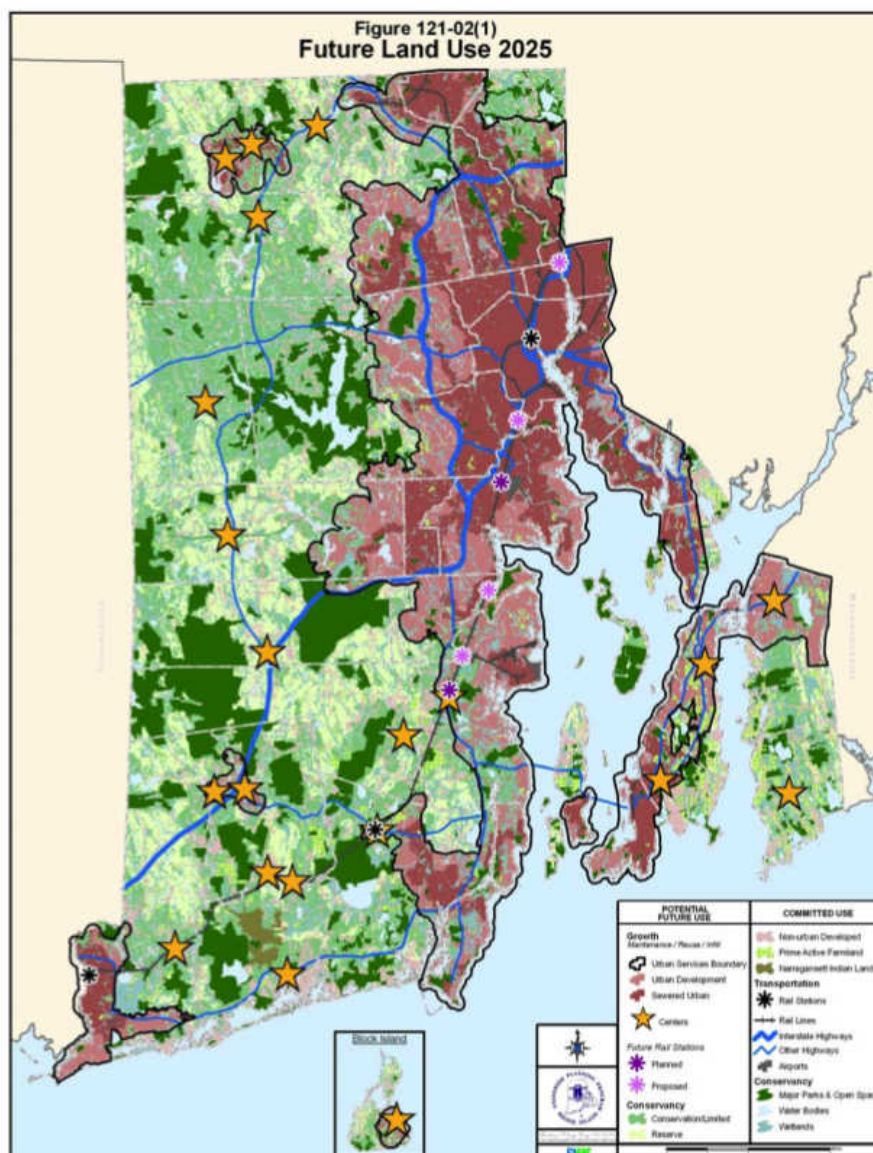
Rhode Island is a place where taking advantage of renewable energy opportunities is a norm. Rhode Island leads the nation in the development of off-shore wind power, in part by having a clear, open, and efficient permitting and approval system, guided by the the Ocean Special Area Management of the Coastal Resources Management Council. While on-shore opportunities for renewable energy are not so dramatic, they are relatively pervasive. This does not mean that they are the same in every location. Coastal Rhode Island has better wind conditions; the rivers that flow to ward the Bay from northern and western Rhode Island provide hydro-potential. Site specific conditions bear on the feasibility of solar thermal and geo-thermal energy. While renewable energy has up-front capital costs, fuel costs are either nothing or much lower than for conventional fossil fuels. Thus renewable energy can mitigate price volatility.



Rhode Island is a place where vibrant commitments to energy efficiency and renewable energy contribute to a conducive environment for energy related science, technology, innovation and diffusion efforts. While some places, Texas for example, can be build economies based on energy abundance, other places per force must excel by building economies that emphasize efficiency. Japan, certainly one of the world's economic

powers, has scant indigenous energy resources. Rhode Island takes the latter course and makes energy efficiency an economic asset. High demand for efficiency spurs the development of a cluster of capabilities and economic opportunities.

Rhode Island reverses the forces of centrifugal development that were so strong the in the second half of the twentieth century. The return to densification increases amenity, reduces reduces travel distances, and preserves open space and environmental quality: it builds on Rhode Island distinctive mix of city, town, and village centers. Densification allows more people to walk to work and improves the viability of public transportation.



Increased densification coupled with changed consumer demand and revitalized national

standards for the fuel efficiency of cars and light trucks make it possible for Rhode Island to meet goals for overall energy efficiency and reduction of greenhouse gas emissions.

This bold vision for Rhode Island arises from a synthesis of existing plans and initiatives, including Statewide Planning's *Land Use 2025* (2006), the Economic Development Corporation's *2009 Economic Growth Plan*, the Economic Policy Council's *Rhode Island Economic Strategy: Grow the Top, Build a New Middle, and Move the Bottom Up* (2008), the Energy Efficiency and Resources Management Council's *Opportunities Report* (2008), the RIWINDS *Final Report Phase I* (2007) and related materials prepared for the Ocean Special Area Management Plan (2009), the Science and Technology Advisory Council's draft plan *Accelerating Innovation Through Collaboration* (2008-2009), the Greenhouse Gas Stakeholders Process's *Rhode Island Greenhouse Gas Action Plan* (2002).

#### 4. How do we get there? -- Implementation Strategy.

While the vision of where we want to be is derived from plans and initiatives developed by a diverse of array of Rhode Island working from different perspectives and with different purposes and goals, the catalysts for the transformation contained in that vision are two: first, the desire of Rhode Islanders to do things differently and to make their state a better place and second, the availability Federal stimulus funding.

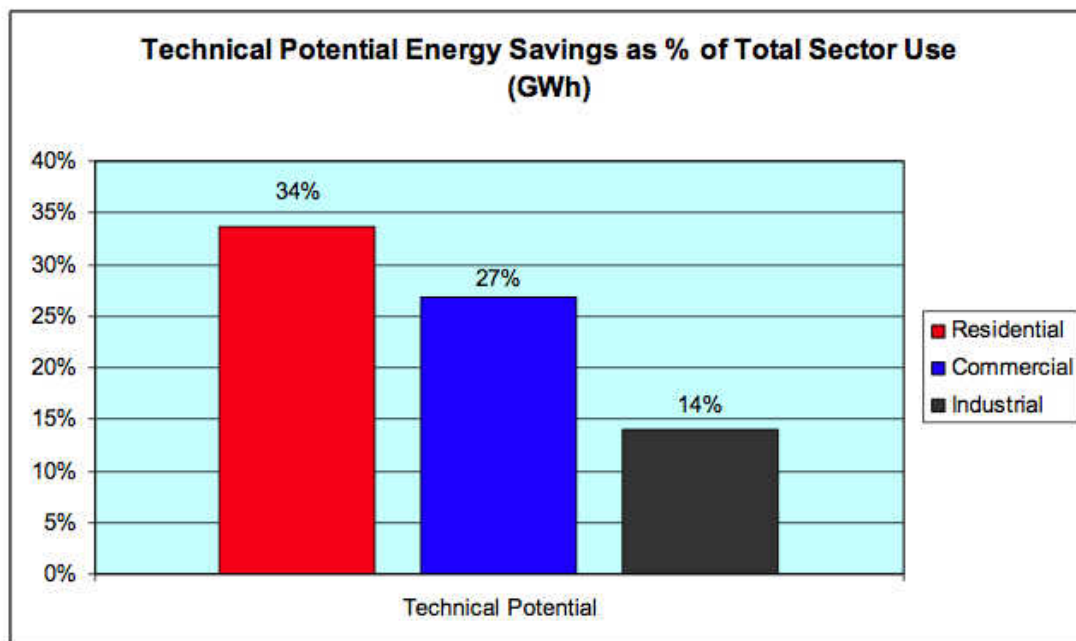
Rhode Island of both necessity and choice embraces the purposes of ARRA-DOE stimulus:

- Increasing jobs.
- Increasing energy cost savings.
- Reducing dependence on imported energy.
- Reducing environmental impacts of energy production and use.
- Transforming markets.
- Achieving program sustainability and leveraging.

It is in Rhode Island's economic interest to increase energy efficiency to 25 percent above 1990 levels by 2012; do so will help dollars stay in the Rhode Island economy.

To accomplish these purposes, Rhode Island will use ARRA-DOE funds, so far as possible through existing programs and a manner that achieves leveraging and sustainability, to:

A. Invest in energy efficiency across sectors, with especial attention within sectors to areas where the needs and the opportunities are the greatest. Because Rhode Island is a place where the levels of new construction have been comparatively, efficiency efforts will be strongly oriented toward existing buildings, structures, and operations.



As has been noted, Rhode Island has an older housing stock, about thirty percent of the state's housing predates 1940, and much of this located in the older industrial centers, where household incomes are lower. Rhode Island will develop a continuum of support to assist low, moderate and medium income households reduce their energy costs. This effort will be guided by the Northeast Energy Efficiency Partnership's "whole house" principles and will involve demand management programs for all major fuel types, including heating oil.

B. Invest in renewable energy development and deployment. Rhode Island has an opportunity to accelerate the development of off-shore wind power, doing this will leverage massive private investment, to advance community scale projects, and to build a sustainable market for site specific renewable energy installations. The principal opportunities for community scale projects are first, wind generation in coastal communities, and hydro projects, which may be at a neighborhood or large development scale in in-land areas. Both of these require expertise and can benefit from being undertaken contemporaneously. For example, the transportation and set-up costs for wind generators are substantial, and if the necessary equipment can be used for more than project while it is Rhode Island, economies should be realized.

Smaller scale applications of renewable technology, solar thermal, photo-voltaics,

geo-thermal, and wind generation have distinct operating characteristics and economics, Rhode Island will act to establish a sustainable market such technologies. This will involve a commitment to market transformation.

Bio-mass opportunities will be pursued. While these are not likely to be sufficient to accomplish a shift in energy supply at this time, they are important because small contributions add up and because they can constitute a departure from wastefulness.

In addition to these two major areas of investment, Rhode Island will use ARRA-DOE funds through the SEP to provide training on the use of building codes and to help build organizational infrastructure. The use of codes providing for high performance building will assure that new construction in Rhode Island contributes to meeting the state's objectives for energy efficiency.

The SEP will be used to buttress the logic of *Land Use 2025*. Future land use patterns to the extent reasonably feasible should help meet energy objectives, not detract from progress. The tools needed to implement *Land Use 2025* at the local level should be recognized as having energy efficiency benefits. The support for Land Use 2025 complements Clean Cities efforts.

Rhode Island recognizes and supports the need to improve the fuel efficiency of automobiles and light trucks, which needs to be done at the Federal level. Vehicle fuel efficiency is critical to meeting goals for overall increases in energy of 25 percent above 1990 levels and for reducing greenhouse gas levels.

The ARRA-DOE SEP stimulus in Rhode Island will be considered consonant with support for mass/public transit. The benefits cross program purposes and funding opportunities. Rhode Island will have increased vitality with a reinvigorated RIPTA and extended commuter rail.

This plan concludes where it began with the jobs imperative. Rhode Island has borne higher levels of unemployment than other New England states, and has lower incomes than neighboring Massachusetts and Connecticut. Developing the "green economy" sector is a priority for the state and its economic development agency. Green economy job growth amplifies Rhode Island's science and technology enterprise. The two need to proceed in conjunction.